

DEDICATED REDUNDANCY CIRCUITS FOR DIFFERENT OPERATIONS IN A
FLASH MEMORY DEVICE AND METHODS OF OPERATING THE SAME

ABSTRACT

5 A flash memory device can include a first redundancy circuit configured to
provide read repair information for read operations to the flash memory. The flash
memory device can also include a second redundancy circuit, separate from the first
redundancy circuit, configured to provide write repair information for write
operations to the flash memory. The flash memory device can include a dedicated-
10 read operation redundancy circuit configured to provide read repair information and a
dedicated-write operation redundancy circuit configured to provide write repair
information. The flash memory device can include also include a first redundancy
circuit configured to store an address of a defective memory cell in the flash memory
and a second redundancy circuit, separate from the first redundancy circuit,
15 configured to store the address of the defective memory cell.